

Homogenous smoothed DEA-bootstrap optimization of robust technical efficiency in livestock-oilpalm integration in Johor, Malaysia

Abstract

A homogenous smoothed DEA-bootstrap estimator a simulation method set with 2000 bootstrap iterations was employed to optimize robust technical efficiency and its determinants in goat-oil palm and cattle-oil palm integrated plantations under smallholder scheme using 255 plantations drawn from 10 districts of Johor, Malaysia. Box and whiskers plots were conducted for outlier detection and hence, extreme observations were eliminated in the data set. The study disaggregated production inefficiency from noise via bias estimation which captures exogenous factors beyond farmers control such as climate, policy shocks, flood, torrential rainfall, disease and others. Result show higher bias-corrected technical efficiency and lower bias estimate in the cattle-oil palm relative to the goat-oil palm integration, thus the cattle-oil palm system was adjudged a better system than the goat-oil palm integration. All plantations operate under sub-optimal level and increasing returns to scale rather than poor management, the small farm size nature of the plantations was adjudged as the main cause of inefficiency. Age, education, years of integration, extension visit and credit has shown positive and significant relationship with technical efficiency. Policy decision encouraging increased farm size and one that can mitigate the effect of some detrimental exogenous factors will help increase their efficiency status.

Keyword: Bias; Bootstrap; Iteration; Noise; Simulation